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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,542	02/10/2004	Donald A. Seccombe JR.	BTU-099XX	6694

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EXAMINER
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LEUNG, PHILIP H

ART UNIT	PAPER NUMBER
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3742

DATE MAILED: 04/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/775,542

Applicant(s)

SECCOMBE ET AL.

Examiner

Philip H. Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### DETAILED ACTION

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-12, 14-18 and 38 are rejected under 35 U.S.C. 103(a) as being obvious over Rokhvargher (US 5,911,941) or Brennan (US 6,344,634), in view of Bowden (GB 2 262 333) combined with Sato et al (US 2003/0071037) or Tsukamoto et al (US 5,954,986) (all previously cited).

Rokhvargher shows a system for sintering ceramics including a furnace having a furnace chamber, a support assembly, a microwave heating source and a convection/radiation heating source for heating the ceramic materials (see Figures 1-5, col. 4, line 62 - col. 5, line 19 and col. 7, line 1 - col. 13, line 17). Brennan also shows a system for sintering ceramics including a furnace having a furnace chamber 10, a support assembly, a microwave heating source 16 with a controller 18 and a convection/radiation heating source with a controller 20 for heating the ceramic materials (see Figures 1-3 and col. 3, line 55 - col. 7, line 55). Therefore it can be seen that Rokhvargher or Brennan shows every feature as claimed except for the additional use of one or more eductors each having an outlet located in the furnace chamber to provide circulation of gas within the chamber. Bowden shows a furnace for sintering ceramics including a microwave

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cavity 10 having a chamber 11, a heating source 20 and eductors 23 on opposite sides of the chamber 11 to provide circulation of the atmosphere within the chamber (see Figures 1-7 and pages 4-8). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Rokhvarger or Brennan to use one or more eductors to provide or supplement the circulation of the atmosphere within the furnace chamber in order to eliminate any stagnation areas within the chamber for a more uniform temperature environment throughout the furnace chamber for more uniform heating result, in view of the teaching of Bowden (at page 7, first paragraph). Rokhvarger or Brennan combined with Bowden does not show an opening on the support aligned with an eductor to provide a circulation path. However, Bowden teaches that the screen 24 supporting the workpiece 19 may be porous to allow heated gas passing there through. Anyway, Sato shows a microwave sintering furnace with insulating walls 6 and 7 supporting a workpiece. An eductor 9 for supplying a gas through holes 6a, 7a, 7b, 6b aligned with the eductor 9 and outlet 10 to form a circulation passage (see Figures 1 and 2 and paragraphs [0018]-[0025]). Tsukamoto also shows that it is well known in the art of combination microwave and convection oven to provide heated air jet valves 19 locating above and below a load support 13 which including openings 94 to allow the air to form an air circulation passage for more direct heating of the load (see Figures 2-5 and col. 9, lines 1-63). It would have been further obvious to one of ordinary skill in the art at the time of the invention to modify Rokhvarger or Brennan combined with Bowden to provide at least one opening on the support aligning with one or more eductors so that the heated air can more efficiently heat the load by direct contact for more uniform heating result, in view of the teaching of Sato or Tsukamoto. In regard to claims 3 and 4, Rokhvarger shows the use of microwave sources with

different frequencies (see col. 4, line 62 - col. 5, line 19 and col. 13, lines 1-3). The control system of Rokhvarger or Brennan are controlled in all stages of the thermal process (see Figure 1 of Rokhvarger and Figure 1 of Brennan).

3. Claim 13 is rejected under 35 U.S.C. 103(a) as being obvious over Rokhvarger (US 5,911,941) or Brennan (US 6,344,634), in view of Bowden (GB 2 262 333) combined with Sato et al (US 2003/0071037) or Tsukamoto et al (US 5,954,986) as applied to claims 1-12, 14-18 and 38 above, and further in view of Marks et al (US 5,660,543) (previously cited).

Rokhvarger or Brennan combined with Bowden and Sato or Tsukamoto does not show the operating of the eductors in alternating manner. Marks shows that it is well known in the art of convection heating furnaces to use two plenums 48a, 48b with openings for alternate air flows on both sides of the workpieces 26 (see Figures 1-4, col. 3, line 47 – col. 4, line 4 and col. 4, line 60 – 8, line 10). It would have been further obvious to one of ordinary skill in the art at the time of the invention to modify Rokhvarger or Brennan Bowden to provide eductors on both sides of the workpiece and form air flows in an alternate manner so that the workpiece is subject to a pulsed heating by heated gas for better heating result, in view of the teaching of Marks (at col. 8, lines 11-46).

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4. Claims 19-37, 39 and 40 are rejected under 35 U.S.C. 103(a) as being obvious over Rokhvarger (US 5,911,941) or Brennan (US 6,344,634), in view of Bowden (GB 2 262 333) combined with Marks et al (US 5,660,543).

Rokhvarger shows a system for sintering ceramics including a furnace having a furnace chamber, a support assembly, a microwave heating source and a convection/radiation heating source for heating the ceramic materials (see Figures 1-5, col. 4, line 62 - col. 5, line 19 and col. 7, line 1 - col. 13, line 17). Brennan also shows a system for sintering ceramics including a furnace having a furnace chamber 10, a support assembly, a microwave heating source 16 with a controller 18 and a convection/radiation heating source with a controller 20 for heating the ceramic materials (see Figures 1-3 and col. 3, line 55 - col. 7, line 55). Therefore it can be seen that Rokhvarger or Brennan shows every feature as claimed except for the additional use of one or more eductors each having an outlet located in the furnace chamber to provide circulation of gas within the chamber. Bowden shows a furnace for sintering ceramics including a microwave cavity 10 having a chamber 11, a heating source 20 and eductors 23 on opposite sides of the chamber 11 to provide circulation of the atmosphere within the chamber (see Figures 1-7 and pages 4-8). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Rokhvarger or Brennan to use one or more eductors to provide or supplement the circulation of the atmosphere within the furnace chamber in order to eliminate any stagnation areas within the chamber for a more uniform temperature environment throughout the furnace chamber for more uniform heating result, in view of the teaching of Bowden (at page 7, first paragraph). Rokhvarger or Brennan combined with Bowden does not show the operating of the eductors in alternating manner. Marks shows that it is well known in the art of convection

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heating furnaces to use two plenums 48a, 48b with openings for alternate air flows on both sides of the workpieces 26 (see Figures 1-4, col. 3, line 47 – col. 4, line 4 and col. 4, line 60 – 8, line 10). It would have been further obvious to one of ordinary skill in the art at the time of the invention to modify Rokhvarger or Brennan combined with Bowden to provide eductors on both sides of the workpiece and form air flows in an alternate manner so that the workpiece is subject to a pulsed heating by heated gas for better heating result, in view of the teaching of Marks (at col. 8, lines 11-46). In regard to claims 21, 22, 25 and 26, Rokhvarger shows the use of microwave sources with different frequencies (see col. 4, line 62 - col. 5, line 19 and col. 13, lines 1-3). In regard to claim 19, the removal of binders (binder burnout) in processing ceramic materials is well known, for examples; see Rokhvarger, col. 19, lines 4-17. The control system of Rokhvarger or Brennan are controlled in all stages of the thermal process (see Figure 1 of Rokhvarger and Figure 1 of Brennan).

5. Applicant's arguments filed 12-20-2005 have been fully considered but they are not persuasive. The argument that the tubes 23 in Bowden are not eductors as claimed is not persuasive. Firstly, there is no limitations in the claimed specifying the function of the eductor as “a device that provides a high volume flow of gas”. Secondly, the tubes 23 in Bowden which are used for gas circulation to and from the furnace box 11 are also capable of “high volume flow of gas as “high volume” is a relative term. Moreover, they are definitely capable of “providing circulation of gas within the furnace” as actually claimed. Furthermore, the screen 24 of Bowden clearly porous and therefore also meets the claimed “one or more openings through the support assembly” as claimed. Clearly, since the workpiece is placed inside the screen 24, the

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screen is considered as the claimed support assembly. In Sato, although the tube elements 9 and 10 is for degassing, it can be used as for circulating heated air also. It is pointed out in the Orbeck (US 5,795,146) patent that is incorporated by reference in this application, it states that “the eductor provides for increased circulation of atmosphere within the furnace for heat transfer or outgassing purposes (see abstract, lines 1-7). Therefore, it shows that the degassing tubes 9 and 10 are similar to the eductors as claimed. It is not necessary for Sato to indicate its insulating members are able to support the object to be sintered as long as it teaches the use of openings therein for air passages. Anyway, the claimed invention does not limit to a sintering process as it claims “a system for thermally processing materials” only. Similarly, Tsukamoto teaches the use openings 94 in the support turntable. The eductors (nozzles) are effectively aligned to the openings, as there is so many openings in order to allow air flow from one side to the other for circulation. In regard to claims 13, 19 and 23, the claimed “alternating manner” is meaningless because only “one or more eductors” or “at least one eductor” is claimed. It is not seen how “one or two eductors” can form an alternating pattern. In regard to claim 33, the tubes 23 in Bowden are aligned with the screen 24 openings which is porous. The number of eductors would have been a matter of engineering expediency depending on the size of the furnace as long as there is one or more eductors.



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6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip H Leung whose telephone number is (571) 272-4782. The examiner can normally be reached on flexible.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on (571) 272-4777. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Philip H Leung  
Primary Examiner  
Art Unit 3742

P.Leung/pl  
3-29-2006